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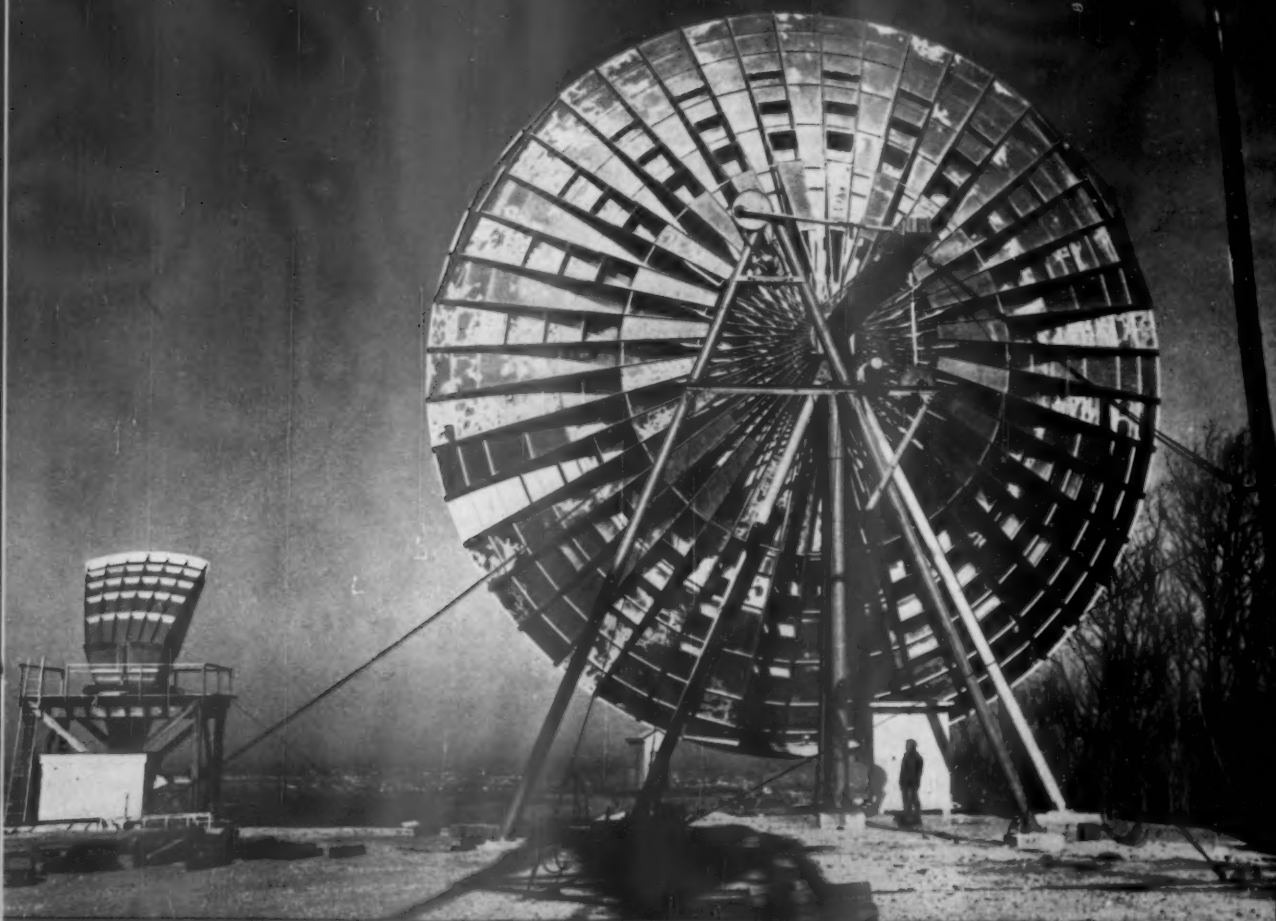
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April 2, 1955

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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Long-Range TV

See Page 21

A SCIENCE SERVICE PUBLICATION

EUGENICS

Control Spreads Ills?

Possibility suggested that treatments for hereditary diseases, like insulin for diabetes, might increase the incidence in long run. Previously, sufferers' early death provided control.

► AS ONE disease after another is brought under control by the progress of medical science, there is a possibility that the controlled disease may spread until the entire population is sick with it.

This paradoxical situation is suggested as a definite possibility in the case of inherited diseases by Dr. Stanley M. Gartler of Columbia University's Institute for Study of Human Variation in New York. Just how serious the problem is depends upon the particular way by which the individual disease is inherited.

One such hereditary disease is diabetes. Before the invention of insulin, the early death of persons with diabetes provided an automatic control of the disease. Diabetics just did not live to grow up, marry and have children who in turn would develop diabetes. Now it is extremely rare for a person to die of diabetes.

There are four ways by which such a hereditary disease could be maintained in a population against the tendency for death to interrupt the chain (when there was no effective therapy).

One system is by mutation. If the mutation rate is such that one out of 400 germ cells carries the disease, then with control of the disease it would take 150 generations or 4,000 years for the disease to spread to serious proportions throughout the whole population. This is too long a time for most people to worry about.

The second system which might apply assumes "selection in favor of the heterozygote." This means that carriers of the disease are more likely than others to have children who survive. In this case, the disease would spread to serious proportions in only 75 generations or about 2,000 years. But the disease could never spread to affect the whole population.

The third system is "gametic selection." This means that the germ cell carrying the disease is more likely to result in offspring than other cells. In this case, the disease would spread faster and could be expected to reach serious proportions in 45 generations or around 1,250 years, Dr. Gartler says.

The final possibility is that parents carrying a hereditary tendency to the disease might, intentionally or not, have larger families (perhaps in the hope of being saved by some healthy children).

If this happens, it could spread the disease to serious proportions within 20 generations or less than 500 years.

Diabetes is, of course, not the only such hereditary disease. Another is the serious sickle cell anemia. It is possible, Dr. Gartler

suggests, that the greater frequency of this disease in Africa as compared with America may be due to a resistance of the disease-carrying cells to the malarial parasite. Control of mosquitoes in America may have taken away the malaria survival advantage of those with sickle cell anemia inheritance and thus tended to reduce incidence of the anemia.

Dr. Gartler's suggestion that medical control of a disease might result in its spread is contained in a report to *Eugenics Quarterly*. (March.)

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STATISTICS

Predict Over 63,000,000 Children in Ten Years

► THE UNITED States will have more than 63,000,000 children under age 18 by 1965, statisticians of the Metropolitan Life Insurance Company predict.

The prediction is based on projections by the U. S. Bureau of the Census.

The number of children under age 18 in the U. S. now number about 54,500,000. This is an increase of 13,000,000 in the 10 years since the end of World War II.

The increase for the 10-year period broke all previous records and was greater than the gain during the preceding 45 years.

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PHYSICS

Moon Is Not "Hot"

► THE MOON'S surface has so little radioactivity that exploration by humans there would not be dangerous, Dr. S. F. Singer, physics professor at the University of Maryland, told the Aero-Medical Association meeting in Washington.

The most plentiful material produced by cosmic ray bombardment of the lunar crust is tritium, the triple-weight hydrogen of H-bomb importance, but "its amount will be much too small to have any biological effects," he reported.

Dr. Singer also calculated the effects of cosmic rays at extremely high altitudes, particularly collisions of energetic particles from outer space on the nucleus, heart of the atom. Nuclear bombardment can radically and irrevocably change the character of the element. Iron can be transformed into chlorine. Once a nucleus is broken up, it does not repair itself.

Some of the energy of incoming primary

• RADIO

Saturday, April 9, 1955, 5:00-5:15 P.M. EST
"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. Reuben G. Gustavson, president and executive director of Resources for the Future, Inc., Washington, will discuss "Energy and People."

ELECTRONICS

Projection TV May Solve Color Problems

► AN EXPERIMENTAL color TV receiver that projects the image on a cabinet screen has been developed that might cut the cost of color sets and eliminate the problem of color purity.

Three separate tubes are used in the device, each one to project a different hue. These projection tubes individually would cost one-fifteenth as much as a tricolor tube used in present commercial models. There would also be a saving in maintenance, since if one tube fails only that one must be replaced.

The projection receiver would be housed in a shallow cabinet, and test models have produced a 240-square-inch picture, W. F. Bailey and R. P. Burr of the Hazeltine Corporation, Little Neck, N. Y., told a meeting of the Institute of Radio Engineers in New York.

The designers have also solved the problem of making the colors coincide on the screen and, since each of the tubes shines a separate color image on the screen, the color purity problem "simply does not exist," they said.

They called for a renewed study of projected color TV in view of new developments which have increased the reliability and performance of such designs.

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cosmic ray particles is converted into matter. These created particles have further effects, but of an atomic rather than nuclear kind.

Atomic effects, which are reversible, are being investigated by many scientists, but the irreversible nuclear changes caused by primary cosmic ray particles were discussed for the first time by Dr. Singer.

Biologically, an exposure of one day above the atmosphere near the earth's poles is equivalent to an exposure of 100 days at 10,000 feet, Dr. Singer calculated. He concluded that the secondary, or atomic effects, would "be more serious than the nuclear effects."

The best shielding against either nuclear or atomic changes is material with high proportions of hydrogen. Water or kerosene and similar fuels are "18 times better on a weight basis than iron," Dr. Singer said.

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AEROMEDICINE

56 Hours in Jet Planes

Airmen remained in cockpit for almost two and a half days in full flying gear without signs of major stress. Crew claimed that "g" suits kept muscles from getting stiff.

► MEN CAN stay in the cockpits of present jet aircraft for 56 hours without major stress. Four men have already done this, thus exceeding the time of the 47-hour non-stop flight of a B-47 bomber in December, 1954.

The 56-hour trial was made in a grounded F-84 plane. Results were reported to the Aero Medical Association meeting in Washington by scientists of the U. S. Air Force Aero Medical Laboratory at Wright-Patterson Air Force Base, Ohio.

With the development in recent years of in-flight refueling technique, it was pointed out, the success of future combat missions will be measured by how long the crew can stay continuously in the plane without losing efficiency as well as how long the aircraft can be kept continuously aloft.

Although the men came through the 56-hour trial without showing signs of major stress, their condition and mental performance deteriorated during the last four hours. This is the period demanding high performance for survival.

The test was divided into three periods of low, high and low performance, representing take-off and long cruise to the target area, period of active combat, and cruise home from the target area. During the first and last periods, of low performance, the man in the test operated test equipment for 15 minutes in each hour and was allowed to sleep if he wished. During these two low-performance periods, three emergency tests of 10 minutes each were given to check the man's ability to operate at full efficiency on short notice.

During the middle period of high performance, the man operated the test equipment continuously and was required to remain as alert as possible.

Brain waves, muscle electric potentials, heart rate, and skin resistance to show emotional changes and nervous system response were measured during the various test periods. Psychological tests to measure reaction time and alertness were also given.

Fruit and vegetable juices, peppermint candy, fruit drops and jelly beans and pre-

chilled water were stored where the man could reach them. Typical personal equipment consisted of long cotton underwear, Air Force-Navy "g" suit, Mark IV liner and outer shell, P-3 helmet, winter flying gloves, wool socks, A-13A oxygen mask, B-5 parachute and A-1 survival kit.

The "g" suit was considered "quite remarkable" by the men in keeping muscles from getting stiff and cramped. One man said it was equal to "getting out of the cockpit and running a good ways." This was because it helped keep blood circulating in the legs and buttocks.

Helpful modifications of present standard equipment included:

A tiltable insert liner in the standard F-84 ejection seat that allowed the man independently to change the angle of the seat back and pan, thus relieving fatigue.

An experimental dynamic cushion. This is an inflatable pneumatic cushion that cycles at a specific rate. Compressed air is supplied to the cushion through an adjustable valve so the man sitting on it can vary the total volume of air and control the rate of inflation and deflation. This also helped reduce fatigue and soreness from the long sitting.

The study was reported by industrial designer Charles A. Dempsey, Capt. Theodore H. Greiner, USAF (MC), Lieut. Dean Chiles, USAF (MSC), Capt. Neil R. Burch, USAF (MC), Lieut. Darrell Warren, USAF (MSC), Lieut. Norman E. Schmitt, USAF (MSC) and Capt. Jack E. Steele, USAF (MC).

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ELECTRONICS

Direct TV Signals Sent Over Horizon

See Front Cover

► DIRECT TELEVISION and 12-channel telephone transmission through space for 200 miles, without relay stations, ultra-high frequencies has been accomplished by scientists of the Massachusetts Institute of Technology and Bell Telephone Laboratories.

Signals are sent over the horizon by using 10-kilowatt transmitters and antennas 60 feet in diameter. This is 20,000 times the power and 30 times the antenna area used in the present trans-continental microwave system, in which the stations are about 30 miles apart. The new antenna is shown on the cover of this week's SCIENCE NEWS LETTER. At left in the photograph is the antenna now used in such transmissions.

The technique is expected to provide longer communications bridges over water and rugged terrain, a supplement to but not a replacement for line-of-sight transmission.

Scientists have known that ultra-high frequencies travel beyond the horizon, but have thought the transmission too weak and undependable for practical use.

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TOOTHLESS SHARK—It might not seem so from this snarling portrait, but the basking shark is harmless as sharks go. A puzzled fisherman hauled the strange fish in in his shad net off the northern coast of Florida and it was identified by scientists at the oceanarium at Marineland, Fla. The 12-foot-long shark feeds on plankton, minute creatures in the sea. It spends much of its time lying at the surface with its back awash. These sharks mature when they reach a length of 15 feet.

BIOLOGY

Antibiotics Affect Plants

► **BEING ABLE** to cut the amount of nicotine in tobacco plants while they are growing by using antibiotics was the hope expressed by Dr. Louis G. Nickell, plant physiologist of the Chas. Pfizer & Company, Inc., Brooklyn, N. Y.

Discussing the effects antibiotics have had on plant growth, Dr. Nickell told a meeting of the 20th Annual Chemurgic Conference being held in Columbus, Ohio, that scientists are seeking an antibiotic compound which could either increase or decrease the yield of plant products.

"A change in the alkaloid content," the scientist pointed out, "could be utilized to good advantage. For example, if the change were a decrease in yield, this would be desirable if the plant were tobacco since it would have a lower nicotine content."

If the change were an increase, this would be desirable if the plant were a drug producer, he said.

Recently, Dr. E. Steinegger in Switzerland showed that penicillin increased both the growth and alkaloid production of the Jamestown weed or Jimson weed (*Datura stramonium*), whose alkaloids have been used in the manufacture of such sedatives

and antispasmodics as atropine, hyoscyamine and scopolamine.

In discussing the possibility that we are "on the threshold of the antibiotic era of agriculture," Dr. Nickell pointed out that antibiotics such as penicillin, streptomycin and Terramycin have already proved their worth as controls for diseases in both plants and animals and as stimulators of growth in chickens, turkeys, mink, calves and pigs.

Looking to the future, the scientist sees wide use of antibiotics as a valuable new weapon in the insecticide arsenal, "serving the dual role of protection against insects and food spoilage organisms," and at the same time, being safe for the consumer.

Next in store for the agriculturalist, Dr. Nickell reported, is the use of antibiotics in the preservation of food. Preliminary studies reveal that antibiotics can increase the storage life of foods by preventing spoilage organisms from gaining a foothold and rotting the food.

The Brooklyn scientist concluded his antibiotics in agriculture report by stating that antibiotics have come a long way in non-medical use.

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METEOROLOGY

Two Causes for Drought

► **DROUGHT** IN the southern Great Plains is resulting from two weather factors cutting off its usual rainfall: a high pressure area located far over the Pacific and the rain shadow cast by the Continental Divide.

Both can be blamed on weather circulation patterns over the entire Northern Hemisphere, Jerome Namias, chief of the U. S. Weather Bureau's extended forecast section, said.

Rain falls when cold air forces warm, moist air to rise. As it rises, this air expands and, therefore, cools. With sufficient moisture in the air mass and warm temperatures, rain falls.

Prevailing winds in the southern Great Plains at 10,000 to 30,000 feet have been from the west southwest. They smack against the mountains, and are then forced down the eastern slopes. These winds are so strong they keep warm, moist air from the Gulf of Mexico from penetrating deep inland. The air is sinking rather than rising. Result: no moisture falls. Weathermen call this effect the rain shadow.

Far out over the Pacific is another sinking weather pattern. It is a high, or anticyclone, in the upper levels of the atmosphere. As air descends in this gigantic drain, it warms up and dries out. This high pressure area is part of the global circulation pattern that causes the west southwest winds to sweep over and down the eastern mountain slopes into eastern Colorado, western

Kansas, eastern New Mexico, western Oklahoma and western Texas.

A world-girdling band of air high in the atmosphere, known as the planetary wave, seems to control air mass movements. This meandering river of air tends to fall into certain patterns, Mr. Namias said, with very long, stretched out wave motions.

The form and position of these waves is such that he expects the onslaught of dry air in the southern Great Plains area to continue at least through mid-April.

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MEDICINE

Anti-Cancer Factor Has Temporary Effect

► **DISCOVERY** OF an anti-cancer factor in mice has been announced.

The cancer resistance factor develops in mice shortly after they have been exposed to cancer-inducing agents.

The cancer resistance, however, breaks down when the mice are repeatedly exposed for a long time to the cancer-inducing substance.

Vaccinations against cancer and blood diagnostic tests for it, therefore, seem "a relatively remote prospect at this time."

These findings and their interpretation were presented by Dr. Morris Pollard of the University of Texas Medical Branch, Galveston,

at the ninth annual symposium on fundamental cancer research held at the university's M. D. Anderson Hospital and Tumor Clinic, Houston, Tex.

The cancer resistance factor cannot be detected after the appearance of the cancer, Dr. Pollard said. It does not reappear during the subsequent course of the illness. When the factor has disappeared, the tumor grows actively.

The resistance factor has been found in growing spleen tissue and it seems to be specific for the substance causing the cancer.

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The average life of all types of untreated railroad ties is approximately six years.

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AGRICULTURE

New Crops From Afar

► **NEW CROPS** from throughout the world that can be used to produce paper for Bibles and jet engine lubricants are being grown and tested for use in the United States, according to Dr. Byron T. Shaw, administrator of the U. S. Agricultural Research Service.

Two such crops are timber bamboo from the Orient and Dioscorea, a yam from the tropics, Dr. Shaw told members of the National Farm Chemurgic Council at their 20th Annual Chemurgic Conference in Columbus, Ohio.

Timber bamboo, a recent study showed, can flourish throughout much of the Southeast and its pulp is suited for the manufacture of a variety of papers, including thin paper for Bibles, toweling and heavy wrapping paper.

Dioscorea, suited for growing along the Gulf coast and in Puerto Rico, was described by the government scientist as "the best plant source we have found for the cortisone-like drugs."

Many new crops under study today were selected "because they produce critical and strategic materials," Dr. Shaw said.

As examples, he listed castor oil from castor-bean plants, which have been "re-designed" for the United States by breeders. The castor oil has proved valuable in the production of jet engine lubricants, hydraulic fluids, paints, plastics and textiles.

Another crop showing promise is the canaigre, a wild root crop found in the Southwest and Mexico. It is described as the best of all plants studied for use as a farm crop to produce vegetable tannins.

Four fiber crops also under study for use on American farms are ramie, kenaf, sanseveria and phormium. Ramie, now being grown here commercially, produces a strong silky fiber used to make upholstery material for furniture and automobiles. Kenaf is seen as a substitute for jute, sanseveria for manila hemp and phormium for several cordage fibers.

"Whether these crops become established in this country," Dr. Shaw said, "will depend on our ability to make further improvements through research . . . to develop efficient varieties that can be fitted into American patterns of farming."

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PSYCHIATRY

Language, Ills Related

► **MENTAL ILLNESS** is closely associated with disturbances in communication whether through words or through signs, gestures and actions, Dr. Jurgen Ruesch, psychiatrist of the University of California School of Medicine, San Francisco, Calif., told a workshop of the Washington School of Psychiatry.

In normal persons, communication starts with the baby's way of "talking" to his mother by changes of skin color and temperature, rate of breathing and movements such as sucking.

Later such expressions are replaced by movements of the face and hands and feet. The little baby's red face of anger is replaced by the child's slap or kick. Later, language becomes the favorite medium of expression.

In the mental disease schizophrenia, the patient goes back to the young infant's primitive way of communication.

"It is as if these patients were trying to relive, in later life," Dr. Ruesch said, "the patterns of communication that were frustrating in early childhood, with the hope that this time there would be another person who understandingly would reply in non-verbal terms."

The parents' lack of responsiveness in terms of non-verbal action may prevent the child from normal communication development and so lay the foundation for later mental disease.

Many schizophrenics have angular, jerky,

uncoordinated movements carried out at either too slow or too fast a tempo. Such lack of motor agility may well be the result of insufficient practice in non-verbal interaction during infancy.

The manic-depressive patient presents quite a different picture. With him, there is a lack of synchronization between non-verbal and verbal communication.

He is like a movie in which the sound track is not properly synchronized with the picture.

In patients suffering from a psychosomatic disorder such as stomach ulcers, hay fever or hives, there is a predominance of organ language, with action language secondary and verbal language employed least of all. Such a patient may not "bawl you out" if he becomes angry at you, but instead reaches for a soda mint.

The doctor who replies in words to a patient's gestures or action language gives the patient the feeling that what he says is merely noise, and is entirely irrelevant. The patient is unsatisfied and goes somewhere else for aid.

"If a patient comes drunk into the doctor's office, mumbling to himself, and plunges into the doctor's chair, he is using action language," Dr. Ruesch explained. "If the doctor gets up, takes him by the arm, leads him to the door, puts him into a taxi, and gives the driver the patient's home address, the doctor also is using action language."



PREHISTORIC FUNGUS—Greatly magnified photograph shows one of the world's oldest fossils, a Pre-Cambrian fungus, now on display at the American Museum of Natural History. Two-billion-year-old filaments can be seen in this specimen discovered last year in Canada. (See SNL Feb. 27, 1954, p. 130.)

In treating a schizophrenic, a doctor must reply in non-verbal language. Once the patient has become organized on the non-verbal level, then translation into words becomes possible.

With the depressed patient who is out of synchronization, the doctor must produce actions to fit the words of the patient or words to fit his actions.

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INVENTION

Plastic Foam Developed For Boats and Planes

► **A PLASTIC** foam, which promises to cut the partial cost of boat and airplane construction as much as 50%, was shown in Los Angeles at the tenth annual meeting of the Society of the Plastics Industry.

Called "syntactic foam," by its developer, the Bakelite Company of New York, the new lightweight material is produced by bonding microscopic hollow spheres made of phenolic resin together with phenolic, epoxy or polyester resins. The finished product has a cellular structure similar to that of wood and, like wood, the foam can be drilled, sawed or machined.

The density and strength of the material can be controlled during its manufacture.

Designed to be used in sandwich-like structures such as boat hulls and airplane wings as a filler or reinforcer, the plastic foam also has properties that make it useful as an insulator in the manufacture of air-conditioners and refrigerators.

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GENERAL SCIENCE

Diamond Tool Mounting Saves 90% of Crystal

► A NEW way of mounting diamonds in cutting tools will save up to 90% of these hard, precious industrial stones.

Dr. H. Tracy Hall of the General Electric Research Laboratory mounts a small diamond in a shallow cavity on the surface of a wheel-dressing tool. Heretofore, as much as nine-tenths of the costly diamond had to be buried in the mounting to hold it securely.

Titanium hydride is used as a wetting agent for a silver-copper solder and the mount and diamond are brazed by induction heating in high-vacuum, or in an argon or hydrogen atmosphere.

Dr. Hall is one of the team that recently announced the making of synthetic diamonds.

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MEDICINE

Spot TB Patients Who Will Quit Hospital Early

► A MEANS for predicting which patients entering a tuberculosis hospital will stay in the hospital long enough to get the good from their treatment has been developed by a group of scientists at the Veterans Administration Hospital, Houston, Texas.

Every year, almost half of all patients in tuberculosis hospitals leave the hospital against medical advice, the scientists stated in the *Journal of Consulting Psychology* (Feb.).

In fact, they said, medical treatment for this disease is now so effective that when a patient fails to recover it is generally because he cannot or will not stay in the hospital long enough to get well.

It is not just the personality of the patient that makes him willing or unable to endure hospitalization, the investigators concluded.

Factors in the patients' history so important that information about them makes it possible to spot which individuals will stay for treatment and which will take unadvised leave include such items as whether or not the patient has a "service-connected disability pension," and the duration of his illness.

Items that turned out to be of no help in making a prediction were found to include war service, race, marital status and size of family.

The scientists were able to make up a scale with which those entering the hospital can be placed into groups with similar chances of staying or quitting. Such a scale makes it possible to study and compare quitters and stayers while they are still in the hospital.

Scientists who made the report are Drs. Louis J. Moran, George W. Fairweather, Robert B. Morton and Laurence S. McGaughan.

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TRANSLATES CODES — New electron image tube device takes coded signals from tape, keyboard or radio and projects the messages in clearly defined letters. Warren H. Bliss watches the device, which was developed by RCA, in test operation. It can translate at a rate of 100,000 words a minute.

MEDICINE

Typhoid Fever Yields

► GOOD RESULTS in treating typhoid fever with a new antibiotic drug, or so-called mold remedy, were reported in the *Journal of the American Medical Association* (March 19).

The new antibiotic is called synnematin B and comes from an organism called *Tilachlidium*.

It was given to 16 children, aged two and a half to 11 years, at the Hospital Infantil in Mexico City. Most of the patients were poorly nourished and three of them had very severe cases of typhoid. Nine had severe cases and four moderate.

Regardless of the day of sickness on which treatment with synnematin B was started, the temperature returned to normal, the toxic state was relieved, appetite increased and mental alertness improved in two to six days. In addition, the little patients showed pronounced improvement in general well-being.

The patients all recovered and none had any intestinal bleeding or perforations, which are dreaded complications in severe typhoid fever.

Three patients had relapses after the drug was stopped. Two of them had been getting the medicine before the best dosage had been established. Chill was the only reaction to the drug, and this was reduced when a different lot of the drug was used.

The typhoid fever germs were cleared from the blood and the intestinal wastes. None of the patients was a typhoid carrier so far as tests showed three months after recovery. The doctors think the new antibiotic drug kills the germs instead of just stopping their growth, as some antibiotics do.

Chloramphenicol (Chloromycetin) has been the drug of choice for treating typhoid fever. This antibiotic, however, has some disadvantages such as not permanently clearing the typhoid carrier state.

The results of the trial of synnematin B are reported by Dr. Lazaro Benavides V. of the Hospital Infantil, Mexico City, Drs. Birger H. Olson and Stephen H. Holt of the Michigan Department of Health Laboratories, Lansing, Mich., and Gerardo Varela of the Instituto de Salubridad y Enfermadades Tropicales (Institute of Tropical Medicine), Mexico City.

Drs. Olson and Holt had previously shown that synnematin B was not toxic for human beings and that it was active against a wide variety of *Salmonella*, the germ family to which the typhoid fever germs belong. Synnematin was discovered by Dr. R. Gottshall and co-workers at the Michigan State Department of Health and later separated into synnematin A and B.

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PHYSIOLOGY

High Altitude Cuts Vision

Pilots can see only half as far from high altitudes in an empty, cloudless sky. The eye does not remain focused at infinity unless there is something to focus on.

► **FLYING HIGH** in a clear, cloudless sky cuts down how far you can see, contrary to what you might expect.

This is one of the new problems of high-altitude flying when man changes to an environment for which evolution has not prepared him. It is a problem British aviation medical experts are concerned about, Air Commodore T. C. Macdonald, A.F.C., R.A.F., director of hygiene and research at the Air Ministry, London, told members of the Aero Medical Association meeting in Washington.

The maximum range at which the eyes can pick up an object when flying at high altitudes in an empty, cloudless sky is reduced by one-half, he declared.

The condition is called "empty field myopia." It has nothing to do with high speed, lack of oxygen or decompression. Air Commodore Macdonald explained it as follows:

The normal eye when at rest is supposed to focus at infinity. But complete relaxation to the far point is possible only when there is detail present at the far point on which the eye can focus. When this is absent, as in the empty, cloudless sky, the eye involuntarily exerts about one dioptre of accommodation. The point of focus, instead of being at infinity is then at distance of about a yard (one meter).

The pilot under such circumstances can only focus at infinity with the aid of an optical trick or by glancing at an object at least 30 feet away. This latter trick is possible in some aircraft but is not easy in aircraft with very swept-back wings.

Second problem British aero-medical scientists are concerned over is the need for them to play medical detectives. This was highlighted in the studies to learn how victims of the two Comet crashes last year actually died.

A "Sherlock Holmes type of thinking," plus carefully devised experiments to test the thinking, were needed to solve the Comet crash problems.

One of these was that bodies of the Elba crash victims showed scalding or burning of clothed areas, whereas three or four bodies of the Naples crash victims showed darkening of exposed areas of the skin. In no case in either crash was there any singeing or scorching of clothes or hair. The problem was whether the two types of marks were caused by the same agents.

The darkened skin of the Naples victims, the scientists finally learned, was due to suntanning after death. For this finding, the scientists had to "rediscover" the little known physiological fact that melanin, a pigment in the skin, can darken when ex-

posed to long-ray ultraviolet light after death. This was confirmed by experiment. The bodies of the Naples victims were afloat for some 22 hours and exposed to sunlight during that time.

The Elba conditions, it was found by experiment with dead animals, could be produced when a dead body lies in water with a burning layer of kerosene on the surface.

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PHYSICS

Miniature Cyclotrons

► **THE "EFFECTIVE"** masses of whirling electrons in solid matter can be directly measured for the first time in miniature atom smashers.

Working like giant cyclotrons, but on a scale as small as the atom itself, the electrons are stopped in their paths in less than one revolution.

Semiconductors, the wonder materials used in transistors and solar batteries, are being investigated with this new, powerful tool for studying the structure of solids. Dr. Benjamin Lax of Massachusetts Institute of Technology's Lincoln Laboratory reported measurements on the masses of charged carriers, electrons and "holes," in germanium, silicon and indium-antimony to the American Physical Society meeting in Baltimore.

Very high frequencies applied to pure and perfect single crystals of these materials kept at temperatures near 459.72 degrees below Fahrenheit are used in the experiments.

An electron in a solid, Dr. Lax found, "has the extraordinary property that its mass depends on the direction in which it moves." In germanium, the "effective" mass of an electron moving in one direction may be 20 times its mass in another direction. Dr. Lax and his two MIT co-workers, Dr. Herbert J. Zeiger and Richard N. Dexter, have discovered.

In giant atom smashers, a charged particle whirls around, under the influence of a magnetic field, in a circular path. Its frequency, or rate of rotation, depends on the mass of the particle. If an electric field, or kick, having the same frequency, is applied to the particle as it speeds around in its orbit, the particle will gain energy resonantly.

Similar experiments can be performed on electrons in a solid, Dr. Lax said. The mass and, therefore, the frequency of rotation of the electron in a solid, depends on the position of the crystal in relation to the field applied to the crystal.

DENTISTRY

Cavity Sealer Promises To Reduce Dental Drilling

► **THE DENTIST** will not have to drill as much when filling large cavities if a new cavity sealing material lives up to its present promise.

The material can bind a plastic filling to a flat surface inside the cavity, thus eliminating the extensive drilling needed to make dovetails inside large cavities to anchor the filling.

The substance was described by Drs. M. G. Buonocore, W. Wileman, and F. Brudevold of the Eastman Dental Dispensary, Rochester, N.Y., at the meeting of the International Association for Dental Research in Chicago.

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When an electron is missing from its usual place in the crystal, the resulting vacancy, or "hole," behaves as a positive particle with its own peculiar mass properties. Dr. Lax and his co-workers have observed these also. They find that there are two types of holes, a light one and a heavy one.

Experiments similar to those reported by the MIT scientists have been performed at the University of California.

Science News Letter, April 2, 1955

TECHNOLOGY

World's Smallest Storage Battery

► **A STORAGE** battery no larger than a postage stamp and about as thick as a cookie has been developed by Yardney Electric Corporation, New York, to power a secret defense device.

Believed to be the smallest rechargeable battery in the world, the tiny cell weighs one-sixth of an ounce.

Zinc and silver oxide electrodes are used in the cell, which has one-fourth the ampere-hour capacity of a penlight battery that is 16 times bigger. The device is expected to find use in portable communications equipment, electric wrist watches and may revolutionize photography and model airplane equipment.

The battery could operate an electric-powered watch for more than a year without recharging, the company said.

It was described as maintenance-free and spill-proof with a long shelf life. Tests show it gives dependable performance in a wide temperature range and under severe mechanical stress. Dimensions of the cell, which was demonstrated at the Institute of Radio Engineers meeting in New York, are $\frac{1}{8}$ by $\frac{1}{8}$ by $\frac{3}{16}$ inches.

Science News Letter, April 2, 1955

ELECTRONICS

Electronic "Brain" to Use Speedy Tubeless Circuits

► A MINIATURE electronic "brain" for jet planes and guided missiles that would operate, without vacuum tubes, ten times as fast as present tubeless computers is being built in Philadelphia.

Tiny transistors tied together in a circuit known as "direct coupled" would do the trick. The "brain" using this method will be known as TRANSAC, short for "transistor automatic computer."

Leslie J. Woods, director of research and engineering for Philco Research and Engineering Laboratories, Philadelphia, explained that the size, weight and cost of such a computer would be about one-third that of other tubeless computers.

Mass production of such computers making calculations at "phenomenal" rates is expected to result from perfection of the direct-coupled circuit. Speeds would be "adequate for all military operations in the foreseeable future," Mr. Woods said.

A computer built using the new method would perform 600,000 additions or subtractions a second. "Surface-barrier" transistors make possible use of direct-coupled circuits.

Transistors do not generate heat, as vacuum tubes do, and therefore require less space. Their action is faster and, in the new device, power is cut to a thousandth of that for an equivalent computer with vacuum tubes.

In packaging a computer using direct-coupled circuits, all elements required for addition, subtraction, multiplication and division, as well as control circuits used in common, are combined on a single replaceable unit having on it only transistors and resistors. These units are printed wiring "cards."

Simple digital computers, small in size, combining small power requirements with high operating speeds are now possible, Mr. Woods said.

He foresees use of direct circuitry in industrial control devices and high-speed, low-power switching systems as well as in computers.

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ANTHROPOLOGY

Man Learned to Walk To Survive in Trees

► THE ANCESTORS of man may have developed a way to stand upright and walk the earth, not as a means of living a new life on the ground, but in order to preserve the ancestral way of swinging from the trees tops.

This suggestion was made by Dr. W. E. Le Gros Clark, anthropologist at the University of Oxford, England, in his new book *The Fossil Evidence For Human Evolution* (see SNL, March 12, p. 172). Deforestation is no new thing, Dr. Clark pointed out. And even before modern man began,

it became necessary for his apeman ancestors to cross grasslands in order to get from one shrinking wooded area to another.

He also suggested that perhaps water-living backboned animals first gained terrestrial and air-breathing adaptations, not to fit them for life on land but as a necessary way to preserve their aquatic way of life. In times of bad drought, these new adaptations would make it possible for the creature to escape from dried-up rivers or pools and go overland in search of water elsewhere.

Man is not so ancient as some scientists have believed, Dr. Clark concluded. In terms of his body structure, man is no more "unique" than other mammal families.

There is no sound reason for believing that modern man first appeared on earth earlier than the Pliocene geologic period, according to Dr. Clark. This would mean that man first walked the earth not more than 12,500,000 years ago.

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ANTHROPOLOGY

Chinese Resume Digging At Peking Man Site

► AFTER A 12-year interruption, digging has been resumed at Choukoutien in north China in a search for remains of Peking Man and possibly of an even older ancestor of modern man.

Work is being conducted under sponsorship of the Communist Chinese government and under direction of the Laboratory of Vertebrate Paleontology of Academia Sinica. Five teeth are among the new finds of Peking Man. An upper arm bone and lower leg bone, unearthed before the Japanese invasion, have been identified as Peking Man remains.

Reports of the important finds at Choukoutien and others unearthed in West China were made in *American Anthropologist* (April) by Dr. Hallam L. Movius Jr., Harvard University anthropologist. He dug out the information from a Communist China propaganda sheet "China Reconstructs" and from Russian reviews of reports of Chinese scientists. The original scientific reports are not available in this country.

The finds in West China are important because they are the first fossilized human bones found in that part of China. The bones are of part of the skull of a little 10-year-old girl who lived in late Pleistocene times. The skull is believed to be of the *Homo sapiens* type, and is probably more than 10,000 years old.

This is the first evidence that modern man lived in China so long ago. It is hoped that the skull can be dated more exactly from the remains of walnut and oak trees found in the same strata of sand and fine gravel in which the human bones were located.

Find of the little girl's remains was made by Dr. Pei Wenchung, a paleontologist well known in the West who has been identified with research on Peking Man.

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IN SCIENCE

MEDICINE

30 Cups of Coffee Daily Are Probably Harmless

► AN OK on heavy coffee drinking for healthy persons has come from the American Medical Association.

"Drinking 20 to 30 cups of coffee a day probably wouldn't hurt you unless you were not completely healthy to begin with," was the association's report of opinions given by two consultants in answer to a query from a Connecticut physician. Query and answers appear in the *Journal of the American Medical Association* (March 19).

Nervousness, trembling, insomnia, headache, rapid pulse (tachycardia), extra heart beats, excessive water loss through the kidneys, and ringing in the ears and flashes of light before the eyes are symptoms one consultant gave as likely to result from the two to three grams of caffeine in 20 to 30 cups of coffee.

"In healthy persons these effects ordinarily are not serious and disappear promptly if the use of coffee is stopped," this consultant wrote.

He cautioned that in persons with organic disease such as heart, blood vessel, stomach, intestinal or nervous disease, "these effects may be harmful and the excessive use of coffee should be avoided."

The second consultant pointed out that anyone who has to ask his doctor whether he is being harmed by drinking 20 to 30 cups of coffee a day is surely not feeling any symptoms of harmful effect.

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PALEONTOLOGY

Australian Skull Is 8,000 Years Old

► AN ANCIENT skull found near Melbourne, Australia, has been dated as between 8,000 and 9,000 years old.

The age of the skull had baffled leading scientists. Some estimates put the skull's age at 150,000 years. Now it has been dated in the United States by the radiocarbon dating method, R. T. M. Prescott, director of the National Museum of Victoria, announced.

Edmund D. Gill, curator of fossils at the Museum, made a special study of the Maribyrnong River Valley where a workman unearthed the skull.

The radioactive content of the charcoal from a fire lit by one of the ancient tribe of aborigines who frequented the valley long before the Christian Era determined the age of the skull at 8,500 years plus or minus 250 years.

Science News Letter, April 2, 1955

IE FIELDS

TECHNOLOGY

Count Smog Particles Thousand Times Faster

► MICROSCOPIC PARTICLES in smog, factory smoke and cigarette smoke, can be counted and sorted a thousand times faster than by conventional methods with an electronic counter.

In the device, tiny droplets suspended in such gases are diluted and blown past a thin light beam. Droplets are counted and sorted into 12 size classifications at the rate of 150 per second.

Ordinarily these tiny particles are counted and analyzed on microscopic slides, a time-consuming technique.

Development of the electronic counter was sponsored by the U. S. Army Chemical Corps at Camp Detrick, Md., and disclosed at a meeting of the Institute of Radio Engineers in New York by Ernest S. Gordon of the Armour Research Foundation of the Illinois Institute of Technology.

Science News Letter, April 2, 1955

OCEANOGRAPHY

Undersea Swimmers Can See Hot and Cold Water

► AN UNDERWATER swimmer, equipped with an Aqua-lung, fins and goggles, can see the difference between hot and cold sea water.

Employing the popular sport of skin diving, scientists at the Scripps Institution of Oceanography, La Jolla, Calif., report that swimmers have been able visually to detect and to describe temperatures and other physical characteristics of underwater masses.

Investigations off the coast of California showed that skin divers can spot thermoclines, the layers of water which mark the sharp change in water temperature, in three different ways:

1. By observing the vertical distribution of the sea life and other suspended particles, and finding the line of demarcation between the warm turbid water and clear cold water.

2. By viewing the refractory plane between two bodies of calm water of different temperature and density. Here, the scientists found a "mirror" pool of cold water at a depth of 100 feet that had a refractive-index differential great enough to reflect an image of some kelp growing in warm water alongside the pool.

3. By the "stream" lines, like those of heat waves from a radiator, formed during the mixing of water masses of different density. In this instance, the scientists found a convex tongue of dense water four feet high and 10 feet wide at a depth of 60

feet. When the semi-bubble of cold water was penetrated, it looked like two liquids of different densities mixing, such as is seen when colorless alcohol is poured into water.

Findings by human divers can be helpful where the use of instruments is difficult or inconvenient, state Conrad Limbaugh and Andreas B. Rehnitz, who reported the use of skin diving as an aid to underwater studies in *Science* (March 18).

Science News Letter, April 2, 1955

TECHNOLOGY

Liquid Form Makes Nylon Rival Leather or Rubber

► NYLON, FAMOUS in thread form, will appear in bottles on the wholesale materials market if the plans of a company, founded on the silk trade, work out in the field of modern plastics.

The new, tempered form of nylon, named Nylon 8 by the Du Pont Co., is a liquid. It can be molded into fuel tanks, pipes, gaskets and seals, taking the place of rubber or helping rubber resist the solvent action of certain oils and other organic chemicals.

Flowed and hardened into sheets, the new form of nylon can be made into luggage, belts and other "leather goods" specialties, where nylon's long-lived toughness will be important.

As an adhesive liquid nylon can bond wood, metal, glass and paper, and may add to the number of non-woven fabrics. Colors can also be made to stick to plastics, through the medium of the liquid nylon, giving greater variety to designs that can be printed on plastic materials.

The Belding Corticelli Industries, founded in the days of the China silk trade, has been licensed by Du Pont to manufacture and market the new form of nylon. The company has equipped its plant at Putnam, Conn., to turn out the plastic in granular and pellet as well as liquid form.

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MILITARY TACTICS

Helicopter Can Sweep Minefields, Saving Lives

► HELICOPTERS CAN now sweep minefields with a new technique that would eliminate the danger to crews of seaborne sweepers, which may themselves be blown up by mines.

Huge Piasecki H-21 "Work Horse" helicopters, manufactured in Morton, Pa., are able to haul minesweeping equipment faster than regular sweepers and add extra maneuverability. The H-21, which is cradled between two rotors, one in the front and one in the rear, can also operate in waters that may be too rough for small ships. By flying nose-downward, the helicopter pulls several times its load lift capacity.

The "whirlybird" minesweeper could clear an initial path, allowing the formation of minesweeping vessels to finish the job without danger from moored charges.

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OPHTHALMOLOGY

New Eyesight Test Spots Moving Objects

► A NEW test for eyesight, especially suitable for airplane pilots, was reported by Dr. Elek Ludvig of the Kresge Eye Institute, Detroit, at the meeting of the Aero Medical Association in Washington.

The ordinary test in which you sit in a chair and see how many letters you can read on the Snellen chart across the room is good for determining whether your eyes are so farsighted, nearsighted or astigmatic that you need eyeglasses. But, Dr. Ludvig said, fliers need also to be tested for ability to see moving objects.

He calls this kind of seeing "dynamic visual acuity." Most persons develop enough of it for ordinary purposes, such as seeing automobiles coming toward us at an angle. For fliers the ordinary kind may not be good enough, and some fliers may have less than ordinary dynamic visual acuity. Two people may have the same "static" or non-moving visual acuity and yet have very different dynamic visual acuity, Dr. Ludvig found.

A simple way of testing dynamic visual acuity is to view a stationary Snellen letter or other test object through a rotating mirror or prism. In some persons, the visual acuity decreases with the speed of the rotating object. They cannot follow it as fast and accurately as others.

Now that this dynamic visual acuity can be tested, Dr. Ludvig thinks it can be used to select flying personnel.

It should also be possible, he said, to use training procedures to improve this kind of eyesight and to test the results achieved.

Science News Letter, April 2, 1955

AGRICULTURE

Fruit for Northeast Resembles Loganberry

► A NEW fruit, as yet unnamed, is being tested for its possible distribution throughout northeastern United States.

Resembling the loganberry of the West, the new fruit is a cross between raspberries and blackberries. It was developed because other hybrids of the berry family, such as loganberries and Nesselberries, do not survive in the Northeast.

Dr. John Einset and Charlotte Pratt of the New York State Agricultural Experiment Station in Geneva, N. Y., found that the fruit from a cross between the Hailsham red raspberry and the Erie blackberry resembled both raspberries and blackberries in flavor, with some tasting more like just blackberries.

Berries of the new fruit are described by its developers as from one-half to almost an inch in length, from round to oblong in shape and dark red in color. The seedlings ripen over a two-week period in mid-July.

Further testing will be required before the new fruit can be named and distributed.

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GENERAL SCIENCE

Joyous Easter Holiday

The date of Easter, the chief festival of the Christian year, is fixed according to rules adopted many centuries ago. Lilies, rabbits and eggs have become associated with Easter.



EASTER BUNNIES—Any of these four white angora rabbits would make a delightful Easter gift. An old legend says that colored eggs are left by rabbits on Easter Eve, but today the rabbit itself often serves as an Easter gift.

By ANN EWING

► **EASTER**, THE chief festival of the Christian year, falls this year on April 10 for Roman Catholics and Protestants, a week later for those attending the Eastern Orthodox Churches.

The dates for Easter, which is the festival celebrating the Resurrection of Jesus Christ, are fixed according to rules adopted many centuries ago. One reason they vary for the two great religious bodies is the 13-day difference between the Julian and Gregorian calendars.

Lilies, rabbits and eggs have, over the years, become associated with Easter.

Whatever Easter's date, a plentiful supply of lilies in bloom is assured by modern methods used by growers.

Florists have them in many varieties, big and small, fragile and hardy. Approximately 85% of the lilies grown in the United States are Easter lilies, *Lilium longiflorum*. Other commercially important species are the regal lily, the goldband lily, the Madonna lily and the pink-spotted lily.

Before the second World War, nearly all

lily bulbs used in the United States were imported. Now most are produced here.

Research by plant growers has led the way to new floral beauty for lilies. Dr. Samuel L. Emsweller and his co-workers at the U. S. Department of Agriculture's experimental station at Beltsville, Md., are leaders in research on lilies. (See *SNL*, Mar. 26, p. 198).

Perhaps the most dramatic work in lily breeding is the experimentation to double the normal number of hereditary units of the plant, resulting in superior flowers.

Easter lily blossoms are available 12 months of the year now, largely due to a schedule of preplanting cold storage worked out by the Agriculture scientists. They discovered that lilies could be stored at temperatures just below freezing and still give a high flower production as long as a year after storage. Previously it had been thought that temperatures below 35 degrees Fahrenheit would harm the lilies.

Other flowers besides Easter lilies will be carried into thousands of churches during the coming week. They will be arrayed upon the altars and banked against the pul-

pits in preparation for the feast celebrating the triumph of life over death.

Flowers in the churches are natural symbols of Resurrection and life everlasting.

Like many symbols used by Christians, the resurrection symbol of flowers was adopted and adapted out of pre-Christian usage that was practically universal. Many of the old pagan religions symbolized the passing of winter and the re-blossoming of the seemingly dead earth in spring with the flower-wreathed resurrection myths.

It was natural for early peoples, living in a pre-scientific age, to accept flowers as symbols of a resurrection of the dead. For so far as they could tell, the seeds and bulbs and other plant parts, buried in the cold earth like so many corpses, really were dead. For them, something supernatural occurred every time a seed germinated or a bulb threw up its sprout. Spring was a miracle. It still is.

Origin of Easter Eggs

The association of eggs with Easter may also have arisen from pre-Christian spring rites. Spring festivals held about this time of year often included offerings to the pagan gods to insure a bountiful food supply during the forthcoming season.

Our custom of decorating Easter eggs may stem from an ancient desire to make them more appealing to the gods who got them as bribes.

Although hens' eggs have to be colored, most birds' eggs are tinted by nature. The robin's is a lovely blue. Others are protectively and beautifully speckled to blend with their environment.

An old legend relates that colored eggs are the gift of rabbits on Easter Eve. In modern days, the rabbit itself often serves as an Easter gift, especially for young children. Among the most valued are white angora rabbits, with their pure white fur and pink eyes.

Date Changes Yearly

"The first Sunday after the first full moon on or after the twenty-first of March" is the general rule for fixing the date of Easter. If this, the Paschal full moon, should fall on a Sunday, then Easter falls on the next Sunday. The Paschal full moon, the fourteenth day of a lunar month, determined by rules for ecclesiastical computations, should not be confused with the real full moon.

Unlike Christmas, the Fourth of July and many other holidays that occupy fixed places on the calendar, the date of Easter changes from year to year according to certain involved calculations.

A fixed date for the observance of Easter, the first religious holiday ever celebrated by Christian people, has never been universally

accepted because of its historical relationship to the Jewish feast of the Passover.

The feast of the Passover celebrates the liberation of the Hebrews from Egyptian bondage. It was on the first day of this festival that Jesus and his disciples ate the Last Supper. The next day, Friday, was the day of the Crucifixion and the following Sunday the day on which he arose from the dead—the first Easter.

In time a serious controversy arose between the Jewish Christians and those of Gentile descent as to the correct day on which Easter should be observed. To the former, the relationship of Easter to the Feast of the Passover was all-important, and the day of the week was immaterial. The Gentile Christians, unfettered by Jewish traditions, insisted that the Resurrection should always be celebrated on Sunday and placed Good Friday, which commemorates the Crucifixion, on the preceding Friday.

The Council of Nicaea in 325 A.D. put an end to this controversy by deciding that Easter should always fall on a Sunday. The vernal equinox, the first day of spring, was fixed for March 21. This Council further ruled that if the Paschal full moon occurred on a Sunday, Easter would be celebrated on the following Sunday, so that Easter would always follow the Feast of the Passover and never coincide with it. This Jewish memorial feast was celebrated on the fourteenth of the month of Nisan, that is, the first full moon of spring.

The difficulty of having two dates for Easter can be blamed on the fact that the earth takes an uneven time to circle around the sun. The solar year consists of 365 days, 5 hours, 48 minutes and 45.51 seconds.

The moon takes 29.531 days, another odd interval, to finish its trip around the earth. The Egyptians, who calculated the solar year as 365 days, divided the year into 12 equal months each of 30 days, the remaining five days being devoted to festival holidays. Their weeks, however, were ten days long.

The Julian calendar as instituted by Julius Caesar did not include a seven-day week. This was an eastern invention, used both by the Babylonians and the Jews. Not until the fourth century was the week definitely established in Christendom and Sunday proclaimed as the day of worship.

Upon the advice of the Alexandrian as-

tronomer Sosigenes, Julius Caesar adopted 365¼ days as the true length of the year and ordained that every fourth year should contain 366 days. The solar year is, however, 11 minutes 14 seconds shorter than this, so in the course of 1,000 years, the Julian calendar developed a lag of nearly eight days.

In 1582, Pope Gregory XIII, advised by the astronomer Clavius, ordered the calendar corrected by dropping ten days. To avoid further displacement of the beginning of spring, Gregory decreed that the rule of adding an extra day every fourth year should be followed except in the case of those century years whose number is not divisible by 400.

The Gregorian calendar has never been accepted by all Christian churches for calculating Easter or even for calculating other Holy days.

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MEDICINE

Narcotic Drugs Unpleasant

► **WHETHER MORPHINE**, heroin or other narcotic drug causes a pleasant or unpleasant feeling depends a lot on the person getting it and the situation in which it is given.

Morphine and heroin, for example, do not give normal persons the "kick" and pleasant sensations they are supposed to give.

Amphetamine, or Benzedrine, known as "pep pills," on the other hand, is most likely to produce pleasant sensations in normal persons. This drug also may be useful for chronically ill persons because it seems to relieve pain and therefore give a pleasant feeling to such patients.

These are among findings reported by Drs. Louis Lasagna, John M. von Felsinger and Henry K. Beecher of Harvard Medical School and Massachusetts General Hospital, Boston, in the *Journal of the American Medical Association* (March 19).

The Boston doctors tested the effects of morphine, heroin, amphetamine, the sleeping medicine pentobarbital and as a control, sodium chloride, or salt.

The tests were made on normal students, chronically ill patients and "postaddicts" at the U. S. Public Health Service Hospital, Lexington, Ky. None of the persons getting the drugs knew what they were getting. Some of the "postaddicts" were able to guess correctly which drug was given, but some mistook one drug for another.

The effects of the drugs were determined by having the subjects answer questions designed to show whether the effect was pleasant or unpleasant or nothing at all.

In the normal persons and to a lesser extent in the chronically ill, amphetamine surpassed morphine, heroin, pentobarbital and the salt solution in its ability to produce a pleasurable state. The drug most likely to produce an unpleasant state was morphine.

MEDICINE

Find and Make Key Life Stuff Building Block

► **DISCOVERY AND** synthesis of a key building block of living matter was announced by the American Cancer Society in New York.

The new chemical is carbamyl phosphate. It is involved in the building up of such key compounds in the body as urea and the nucleic acids of the cell nucleus.

Its existence was discovered through enzyme studies by Dr. Fritz Lipmann, Nobel Prize winner, and his associate, Dr. Mary Ellen Jones, both of the Massachusetts General Hospital, Boston.

Synthesis of the new chemical was achieved by Dr. Leonard Spector, also of Massachusetts General Hospital.

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The majority of postaddicts considered the effects of morphine more pleasant than heroin, amphetamine or the placebo (salt). Amphetamine was most often described by them as unpleasant.

The results, the doctors stated, show there is no basis for "sweeping generalizations" as if drugs produced certain set effects in all persons at all times.

Much more research and a "more sophisticated and scientific approach" is needed, they said, on the usefulness of drugs and the likelihood of addiction. They particularly recommended fresh consideration to the advantages and disadvantages of heroin. They also advised careful distinction between law enforcement problems in illicit narcotic traffic and safeguards in the legitimate use of drugs.

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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

ANTHROPOLOGY—J. E. Manchip White—*Philosophical Library*, 191 p., illus., \$2.75. Introducing the general reader to various branches of the science from physical anthropology to applied anthropology, including the government of primitive peoples.

ANTIBIOTISM AND IMMUNITY MEDICINE OF TOMORROW—Alexander Komis—*John Wright and Sons (Williams & Wilkins)*, 72 p., paper, \$2.75. Medical science has not yet, the author states, exploited to the utmost the possibilities of immunization.

BIOCHEMISTRY AND PHYSIOLOGY OF PROTOZOA: Volume II—S. H. Hutner and Andre Lwoff—*Academic*, 388 p., illus., \$9.00. The editors look forward to a greatly widened use of protozoa as biochemical tools.

CIVIL AIRCRAFT ACCIDENT: Report of the Court of Inquiry Into the Accidents to Comet G—ALYP on 10th January, 1954 and Comet G—ALYY on 8th April, 1954—Her Majesty's Stationery Office (British Information Services), 48 p., illus., paper, \$1.80. Official report of a difficult piece of aviation detection work.

THE COLLOID CHEMISTRY OF SILICA AND SILICATES—Ralph K. Iler—*Cornell University Press*, 324 p., illus., \$5.50. Information from the fields of geology, mineralogy, agronomy, and zoology, as well as from chemistry.

DOWN TO EARTH: A Practical Guide to Archaeology—Robin Place—*Philosophical Library*, 173 p., illus., \$7.50. How Britain's prehistoric people lived is here pieced together from archaeological finds.

FUNDAMENTALS OF RADIOBIOLOGY—Z. M. Bacq and Peter Alexander—*Academic*, 389 p., illus., \$6.50. Although much remains to be learned in this field, it has already been found that an incredibly small amount of energy can change the life of a cell, a tissue or even an entire organism.

HERE COME THE DEER!—Alice E. Goudey—*Scribner's*, 94 p., illus., \$2.25. A book for little children about deer, elk and caribou families.

INTEGERS AND THEORY OF NUMBERS—Abraham A. Fraenkel—*Scripta Mathematica*, Scripta Mathematica Studies Number Five, 102 p., \$2.75. Developed from talks in an adult education program, this book is intended for gifted high school students, college freshmen and laymen.

LABORATORY MANUAL OF BIOCHEMISTRY—Benjamin Harrow and others—*Saunders*, 4th ed., 164 p., illus., paper, \$3.00. New experiments

added include one on filter paper chromatography.

LIST OF NORTH AMERICAN RECENT MAMMALS—Gerrit S. Miller Jr. and Remington Kellogg—*Govt. Printing Office*, U. S. National Museum Bulletin 205, 954 p., paper, \$3.50. Summarizing results of taxonomic studies up to January 1, 1953, and indicating the forms represented in the collections of the Museum which include 263,214 specimens.

MAKE IT WITH ALUMINUM—Frank K. Coffee, Ed.—*Arco*, 144 p., illus., \$2.00. To make the useful articles for the home described here, you need only the ordinary tools found on practically every work bench.

MATERNAL EMOTIONS: A Study of Women's Feelings Toward Menstruation, Pregnancy, Childbirth, Breast Feeding, Infant Care, and Other Aspects of Their Femininity—Niles Newton—*Hoerber*, a Psychosomatic Medicine Monograph, 140 p., \$3.00. The author, a woman, concludes that these feelings are important and are related to many other aspects of a woman's life.

MATHEMATICS FOR THE CHEMIST: Mathematical Analysis for Chemists, Physicists and Chemical Engineers—G. J. Kynch—*Academic*, 356 p., illus., \$4.80. For chemistry students and older chemists who want to become acquainted with the new types of mathematics now in vogue.

MEN, MICROSCOPES, AND LIVING THINGS—Katherine B. Shippen—*Viking*, 192 p., illus., \$3.00. Describing the lives and works of great biologists.

MOLECULAR VIBRATIONS: The Theory of Infra-red and Raman Vibrational Spectra—E. Bright Wilson Jr., J. C. Decius and Paul C. Cross—*McGraw-Hill*, 388 p., illus., \$8.50.

MULTIPLE SCLEROSIS—Douglas McAlpine, Nigel D. Compston and Charles E. Lumsden—*Livingstone (Williams & Wilkins)*, 304 p., illus., \$7.00. Although the symptoms and morbid anatomy of this disease are well known from classical writings, we are still ignorant of its cause, and treatment remains largely empirical.

NATIONAL PLUMBING CODE: Minimum Requirements for Plumbing—Sponsored by American Public Health Association and American Society of Mechanical Engineers—*American Society of Mechanical Engineers*, 174 p., illus., paper, \$3.50.

PHYSICAL EDUCATION FOR CHILDREN: A Handbook of Objective Activities—D. Cyril Joynson—*Philosophical Library*, 215 p., illus., \$4.75. Intended especially for teachers of children aged from five to 11 years.

PHYSICS OF THE PLANET MARS: An Introduction to Aerophysics—Gerard de Vaucouleurs—*Macmillan*, 365 p., illus., \$10.00. Here is presented information about this curiosity-arousing planet obtained by physical means.

A POCKET CHART OF ORNAMENTAL AND GEM STONES—Sir James Walton—*Pitman*, 73 p., \$2.75. Stones are listed in tabular form according to color and refractive index.

THE PREVALENCE OF PEOPLE—Marston Bates—*Scribner's*, 283 p., illus., \$3.95. An answer to the question: "Might not public health in solving problems of death by disease be creating even more serious problems for the future of death by starvation?"

SOUND INSULATION OF WALL AND FLOOR CON-

STRUCTIONS—Staff, Sound Section—*Govt. Printing Office*, National Bureau of Standards Building Materials and Structures Report 144, 66 p., illus., paper, 40 cents.

SPRING LAKE ARCHEOLOGY—POINT PROFILES—Louis H. Powell—*The Science Museum*, Science Bulletin Number 3, Part 1, 5 p., mimeographed, illus., paper, \$1.00. The first of a series of studies of the archaeology of the Mississippi River shore line at Spring Lake, Minn.

THE STORY OF FAO—Gove Hambidge—*Van Nostrand*, 303 p., illus., \$6.50. The kind of international teamwork described here is "creating a new breed of explorers on the frontiers of social advance, one tough-minded and patient enough to stand persistent frustration."

TECHNIQUES IN CLINICAL CHEMISTRY: A Handbook for Medical Laboratory Technicians—Frederick N. Bullock—*John Wright and Sons (Williams & Wilkins)*, 171 p., illus., \$4.00. Intended to supplement rather than replace more exhaustive manuals.

Science News Letter, April 2, 1955

ENGINEERING

Industrial Wastes Now Make Feed and Fertilizer

► **INDUSTRIAL WASTES** that have been polluting streams and air are now being used to make such products as fertilizers, animal feeds and DDT.

C. Fred Gurnham of Michigan State College told the meeting of the American Institute of Chemical Engineers in New York that these products could be made through relatively simple alteration of manufacturing procedures. The products in many cases more than pays for the salvage cost.

Wastes from the steel, coal, metal finishing, paper and food industries can be used to make animal feeds and fertilizers.

In washing coal, for example, he said, the rinsing water used to be discharged in the stream. However, the residue was found to have such a high market value that not only is it being saved, but sludge deposits from earlier pollution are being dredged from stream bottoms.

How the common industrial waste chemical, hydrochloric acid, could be used to make DDT was reported by Dr. A. J. Teller of Fenn College in Cleveland.

Science News Letter, April 2, 1955

INVENTION

Lunch Pail Is Electrically Heated

► **HOT LUNCHES** for the working man are provided by an electrically heated lunch pail.

Invented by Frank H. Lott of Lebanon, Ore., and awarded patent No. 2,704,319, the lunch pail hot shop is designed so that some of its contents can be heated on a top tray of the pail, while other foods in the lower compartment remain cool.

The top tray is a hot plate which can be plugged into an outlet. The pail itself is a conventional lunch pail and is also designed to be used for that purpose only by removing the electrically heatable tray.

Science News Letter, April 2, 1955

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How To Select BINOCULARS



Dutchman's Breeches

➤ AMONG THE earliest of our wild flowers, and among the flowers most delightful to children, are the "Dutchman's breeches." Many fancied resemblances for which flowers have been named require a considerable stretch of the imagination, but here the likeness is too obvious to escape. If there are nationalities among fairy folk, we know where the fairy "Vrouwen" hang their little boys' small clothes to dry.

It surprises some people a little to learn that these flowers, so unlike poppies in superficial form, are fairly closely related to them botanically. But there are marks of resemblance, nevertheless. The sepals, or outer green parts of the flower, are evanescent in poppies, falling off very easily. So also in the Dutchman's breeches, the sepals vanish as soon as the buds open. Again, the petals of the Dutchman's breeches are short-lived, as are also those of the poppy.

If you cut across the seed-pod of the two flowers, you will see a certain resemblance between the structure and arrangements of the reproductive parts. Another sign of the relationship can be found in the bitter taste of the sap, though that of Dutchman's breeches does not, like the juice of the poppy, contain a poisonous principle.

This dainty little plant grows best in rich soil. You can often find it hiding

away in rich leaf mold accumulated between boulders and in rock crevices in deep, moist woods. Its leaves, very pale on the undersides, all come directly from the ground. The leaves have three main divisions, all of them finely cut.

When big bumblebees visit the blossoms, their weight sometimes bends the delicate clusters to the ground. The bumblebees and long-tongued butterflies are its most frequent guests, however, for short-tongued insects cannot sound the depths of its nectar cups.

Closest botanical relatives of Dutchman's breeches are the squirrel-corn of the woods and the bleeding heart, that old favorite of our grandmothers' gardens. These three flowers belong to the same genus, known to botanists as *Dicentra*, a Greek name meaning two-spurred. They are thus botanical first cousins, while the poppy is related only as a second- or third-degree-removed kinsman.

Science News Letter, April 2, 1955

MEDICINE

Hormone Reaction Gives Cancer Detection Clue

➤ A LEAD to a cancer detection test for some kinds of cancers is seen in the reaction of men with cancer of the prostate to large doses of anti-arthritis cortisone.

Such patients, when given cortisone, excrete large amounts of the chemical scientists call 17-ketosteroid. Healthy persons and men sick with non-cancerous conditions excrete only normal amounts of 17-ketosteroid after large doses of cortisone.

This finding by Drs. Joseph E. Sokal, Philip K. Bondy, Pasquale J. Costa, Clyde L. Deming and B. Marvin Harvard Jr., of the Yale School of Medicine, was announced by the American Cancer Society.

The scientists have reached no conclusion yet about the value of this discovery as a method of detecting cancer. They are certain by now, however, that it will not show up all kinds of cancer.

Science News Letter, April 2, 1955

INVENTION

Indicator for Tire Pressure Patented

➤ A GAUGE permanently attached to the valve stem of a tire to show the pressure of the tire has been patented. The device is also made so that the tire can be inflated through it, without removal from the valve.

Working by means of a calibrated spring, when the pressure in the tire is too low, a colored indicator pops up beneath the transparent glass cover on the gadget. If the pressure is just right for the tire, the colored indicator is not visible. The pressure indicator was invented by Ellwood F. Riesing of Dayton, Ohio, who assigned the patent rights to the General Motors Corporation of Detroit, Mich. The invention was awarded patent No. 2,704,045.

Science News Letter, April 2, 1955

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MEDICINE

Jets a Danger to Obese

Two overweight persons died from decompression sickness after jet flights at high altitudes. Surgeons believe fat cells had ruptured, releasing nitrogen bubbles.

► **HIGH ALTITUDE** flights in jet planes may be dangerous for fat people, it appears from two fatal cases of decompression sickness in jet plane flight reported to the Aero Medical Association meeting in Washington.

Both men were passengers on actual jet flights. Both were very heavy. With heights of five feet, 11 inches, they weighed 240 and 250 pounds. Both collapsed at altitude, one at 35,500 feet and the other at 39,500 feet. One died in 11 and a half hours and the other in six hours.

There was no sign of faulty oxygen supply during the flights. Post mortem examination showed, among other things, that plugs of fat (fat emboli) had gotten into blood vessels of the lungs and brain of one and in the kidney in the other.

Both men also had the "blue baby" opening between the two auricles of the heart. Apparently this had not given any trouble while the men were alive, since one was said to be in good health and the other to have normal electrocardiogram before the flights.

Piecing together the information available, Air Force surgeons figured that as a consequence of fairly rapid decompression as the jet sped aloft, there was gaseous supersaturation in fat depots in the men's bodies. Fat cells were ruptured and fat thus set free into the blood in the veins. Nitrogen bubbles were then carried to the right side of the heart, went through the "blue baby" opening, got into the general circulation and so were carried in sufficient number to the brain to bring on sudden, intensely severe collapse of the circulation and death.

Fat, the scientists pointed out, has long been known as a danger in decompression from increased atmospheric pressures. The reason is that fat serves as a nitrogen reservoir and is a highly important site of nitrogen supersaturation and bubble formation when decompression is relatively rapid.

Obesity predisposes to bends and chokes and other signs of decompression sickness in airmen. Recognizing the hazard, the USAF School of Aviation Medicine has a rule that no one grossly overweight may undertake "flights" in decompression chambers.

In very fat persons, the scientists said, the total amount of nitrogen to be given off through the lungs on rapid ascents would be greater than in lean persons and thus predispose the fat people to bubbles and embolus formation if nitrogen supersaturation should occur.

The two fatal cases were reported by Lt. Col. Webb Haymaker, MC, USAF, Capt. Austin D. Johnston, USAF (MC), and Col. Vincent M. Downey, USAF (MC).

Science News Letter, April 2, 1955

AERONAUTICS

Ejection Seat for VTO's

► **A TOTALLY** automatic ejection seat is now being used in the new vertical take-off fighter planes known as VTO's. It operates "in the shortest possible time and from the lowest possible altitudes."

Installing the system in all single-place aircraft equipped with ejection seats would result in "marked decrease" in deaths following air emergencies, the Aero-Medical Association meeting in Washington was told.

In 78 fatal accidents involving ejection seats, 41 pilots failed to free themselves from the seat before hitting the ground, Comdr. Roland A. Bosee (MSC) USN, and W. C. Buhler of the U. S. Naval Parachute Unit, El Centro, Calif., reported.

To cut down such deaths, an automatic escape procedure from vertical take-off planes has been devised. As the ejection seat is fired from the plane, the safety belt is opened. Strong nylon cords halt the seat for a fraction of a second when it is six feet out of the cockpit. The parachute is then opened and inflated, the pilot being free both from the airplane and seat.

Standing on their tails like rockets, vertical take-off planes literally pull themselves up by their own power.

When air speed is sufficient, they flip over to horizontal flight, operating like conventional aircraft.

In landing, the procedure is reversed, the planes pulling into a vertical position at about 300 feet. For 20 seconds or more they back down, hanging on counter-rotating turbo-props at zero forward speed and

a very slow sinking speed. Landing is the "most critical" time to escape from this type aircraft, Comdr. Bosee and Mr. Buhler have found.

Fully automatic separation and parachute opening from all kinds of airplanes were among several methods urged by two aero-medical specialists to increase "happy landings" from what would otherwise be fatal accidents.

Capt. Richard B. Phillips, (MC) USN, of the Naval Air Station, Glenview, Ill., and Maj. Charles C. Dugan, USAF (MC), also urged good anchorage for pilot seats, better harnesses, strengthening cockpit construction, more complete protection from flying debris, automatic fire prevention apparatus and fire fighting methods, and repeated indoctrination of crews in survival techniques.

Science News Letter, April 2, 1955

MEDICINE

Mental Disease Drug Helps Headache Patients

► **CHLORPROMAZINE**, SYNTHETIC drug gaining fame as promising treatment for mental disease as well as for reducing high blood pressure, is also good medicine for migraine and other headaches.

Good results in this use of the chemical by himself and other physicians was reported by Dr. Herbert C. Archibald of Oakland, Calif., in the *Journal of the American Medical Association* (March 19).

Science News Letter, April 2, 1955

Questions

AGRICULTURE—Bamboo pulp is suitable for the manufacture of what types of paper? p. 213.

□ □ □

MEDICINE—What is the reasoning behind the statement that insulin might spread diabetes? p. 210.

□ □ □

OCEANOGRAPHY—What are thermoclines? p. 217.

□ □ □

PHYSIOLOGY—What causes the visual problems in high altitude flight? p. 215.

□ □ □

PSYCHOLOGY—How are communication and mental illness related? p. 213.

□ □ □

Photographs: Cover, Bell Telephone Laboratories; p. 211, Marineland Studios; p. 213, American Museum of Natural History; p. 214, Radio Corporation of America; p. 218, Fremont Davis; p. 224, Herndon Sales.

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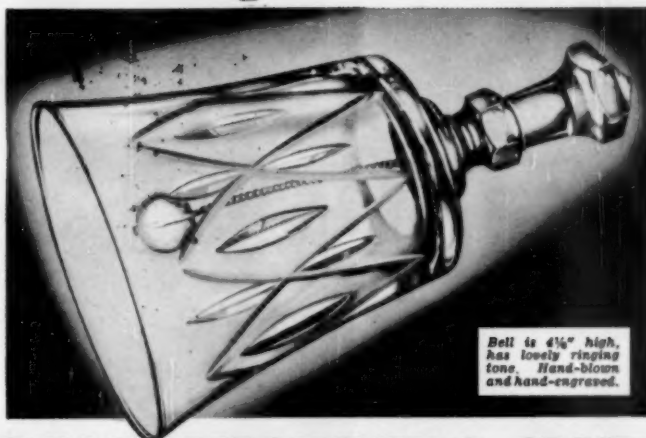
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✿ **FLOATING KNIFE** for Isaac Walton's who accidentally drop their fishing knives into deep water has a four-inch stainless steel blade and five-inch plastic handle. The handle keeps the knife afloat. The back of the blade has saw-tooth edge for scaling.

Science News Letter, April 2, 1955

✿ **PLASTIC FISHING** lures are multi-colored spinners. The heavily overlaid lure of a rigid vinyl withstands a 40-pound pull. Available in three models, $\frac{1}{4}$ ounce, $\frac{3}{8}$ ounce and $\frac{1}{2}$ ounce weights, the lures are made especially for fresh water use.

Science News Letter, April 2, 1955

✿ **OIL FILTER** for automobiles is a permanent porous bronze unit. Cylindrical in shape, the filter is described as filtering out grit particles as small as 39,000,000ths of an inch. All that is needed for cleaning the filter itself is an occasional rinse in gasoline.

Science News Letter, April 2, 1955

✿ **FLOOR SWEEPER**, shown in the photograph, operates by electrostatic or magnetic action, which attracts dust and dirt. Resembling a window cleaner's squeegee, the sweeper is ribbed to fold gently back and forth when it is moved across the floor. Collected dirt is held until removed by user.

Science News Letter, April 2, 1955



✿ **KNOCKDOWN KITCHEN** sink now makes the adage "everything but the kitchen sink" untrue for home do-it-yourself makers. The home assembly sink kit can be put together in ten minutes by hubby with only a screwdriver and a pair of pliers. Kit contains 42-inch single-bowl, single drainboard sinktop, complete faucet and hardware kit, cup strainer, two end panels, and rest of undersink cabinet.

Science News Letter, April 2, 1955

✿ **URANIUM ANALYZER** is designed to help prospectors confirm the presence of uranium in radioactive materials. Weighing only five ounces, and small enough to be carried in a coat pocket, the tester is known scientifically as a spectrum isolation chamber. It employs a special lens of ultra-violet filter material.

Science News Letter, April 2, 1955

✿ **THREE-SPEED TAPE** recorder permits tapes to be cut at $7\frac{1}{2}$, $3\frac{1}{4}$, or $1\frac{1}{2}$ inches per second. The recorder also has fast forward and rewind mechanisms which allow a 1,200-foot spool to be rewound in 70 seconds and cueing of an entire 1,200-foot spool in 90 seconds.

Science News Letter, April 2, 1955

✿ **XEROGRAPHIC COPYING** equipment reduces engineering drawings up to 24 inches by 36 inches onto a 12 by 18 inch paper master, making possible 100 copies in five minutes. Process is a dry, electrical method described as requiring no intermediate negative, sensitized papers, water or liquid chemicals.

Science News Letter, April 2, 1955

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Do You Know?

If sagebrush grows in an area it is a good indication that the soil is fertile and good for planting when irrigated.

Although all available land is farmed intensively in Formosa, the island is barely able to supply its own agricultural needs.

Eighty-eight percent of 1,149 representative farm homemakers in 11 western states did some home sewing, a survey showed.

Long continued overuse of alcohol leads to structural changes in the liver and other organs, largely as a result of the nutritional deficiencies associated with alcoholism.

The chance for a multiple birth is least among mothers aged 20, increases to a maximum for mothers in the late 30's, then falls off toward the end of reproductive life.

Science News Letter, April 2, 1955